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Dairy-Herd-Improvement Letter

ARS-44-233
(Vol. 47, No. 6)

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ARTIFICIAL BREEDING REPORT, 1970^{1/}

Data for the artificial breeding report are based on information received from artificial breeding studs, the National Association of Animal Breeders (NAAB), State Extension Dairymen, and private breeders. A reported 8,578,778 females, 7,344,420 dairy and 1,234,358 beef, were bred artificially in 1970. This was 15.0 percent of the total females of breeding age, based on estimated totals of 15,861,000 dairy females and 41,289,000 beef females. The numbers quoted comprise 46 percent of the dairy and 3 percent of the beef cows. These data represent an increase of 59,357 dairy cows or 0.8 percent and 309,977 beef cows or 33.5 percent over 1969.

As in previous years, the data in the report are based partly on estimations. For example, in cases where the only records available were for ampules of semen sold, the number of first services was estimated to be one-half the number of ampules reported. In addition, the data represent the minimum number of cows bred artificially. This is because figures on a small percentage of artificial breedings (by small custom-freezing organizations and individuals) were not available to USDA.

^{1/} Prepared by G. J. King, B. T. McDaniel, F. N. Dickinson, C. A. Rampendahl, J. J. Corbin, and A. H. Kienast.

Issued August 1971

Dairy bulls bred 6,729,098 cows. These are presumed to be dairy, but a small percentage of dairy services to beef cows are probably included. Beef bulls bred 1,234,358 beef cows and 615,322 dairy cows--a total of 1,849,680. Compared with data for 1969, dairy-to-dairy breeding increased 138,951 or 2.1 percent in 1970; beef-to-beef breeding increased 309,977 or 33.5 percent; and beef-to-dairy breeding decreased 79,594 or 11.5 percent.

Table 1 shows the percentage of U.S. dairy cows and heifers bred artificially, by State, in 1970. These figures show Florida leading with 74.6 percent, Hawaii second with 67.8 percent, and 5 other States with from 60 to 65.2 percent. Percentages for 14 States were between 50 and 59.9 percent, for 9 States between 40 and 49.9 percent, for 7 States between 30 and 39.9 percent, for 10 States between 20 and 29.9 percent, and for 3 States below 20 percent. These percentages are also presented graphically on the map on page 16.

Table 2 shows the breedings to dairy and beef bulls, by State, in 1970. Also tabulated near the bottom of the table are 74,463 cows bred, which were reported by various studs and not credited to any State. Information on beef-to-beef breeding by all-beef studs was obtained through the National Association of Animal Breeders.

Table 3 shows the national and State percentages of dairy and beef cows and heifers bred artificially. Calculated percentages were based on the total number of dairy and beef females presumed to be of breeding age. We used the number of cows 2 years old and older on farms on January 1, 1970, plus a percentage of 1- to 2-year-old heifers on January 1, 1970. Seventeen months is about the average age of first breeding of dairy heifers. Thus, seven-twelfths or 58.3 percent of the number of younger heifers was added to the cows 2 years old and older to obtain the total on which to base the 1970 artificial breeding percentages.

Table 3 shows that, based on the number of all U.S. dairy cows and heifers of breeding age, 46.3 percent of the dairy cows were bred artificially in 1970. Table 3 also shows similar data for beef cattle breedings. Information obtained from beef cattle specialists indicates that about 40 percent

of the beef heifers between 1 and 2 years old are bred each year. Three percent of the Nation's beef cows and heifers were bred artificially in 1970.

Table 4 shows the calculated percentages of the national dairy herd of cows and heifers of breeding age that were bred artificially from 1945 through 1970. The percentage of dairy cows bred artificially reach one percent in 1945. These percentages are shown graphically also in figure 1.

Figure 2 shows the number of beef cattle bred artificially since reporting began in 1963.

Table 5 shows the top 10 States in number and percentage of dairy and beef cows bred artificially. Wisconsin had the highest number (1,376,397) and Florida, the highest percentage (74.6) of dairy cows bred. Montana had the highest number (70,390) and Pennsylvania, the highest percentage (20.7) of beef cows bred.

Table 6 shows the comparison of artificial breeding by State, for 1969 and 1970. The greatest increase in number of dairy cows bred (46,000) occurred in California; the greatest increase in beef cows bred (19,245) occurred in Oklahoma. Twenty-five States showed increases for the number of dairy cows bred artificially and 46 States showed increases for the number of beef cows bred artificially.

Table 7 shows the status of the artificial breeding program from 1939 through 1971.

Table 8 shows that 24 studs which own bulls and report data to the USDA bred cows artificially in 1970. The table also shows data reported for individual operators and six studs that own no bulls or for whom data were reported by the National Association of Animal Breeders. The 24 studs and individual operators serviced an estimated 369,197 herds. However, it is probable that some herds may have been counted more than once when two or more studs bred cows in the same herd. The National Association of Animal Breeders reported data for approximately 22,500 first services and approximately 222,000 services using semen which was custom-frozen or which was sold directly to, or collected by, ranchers.

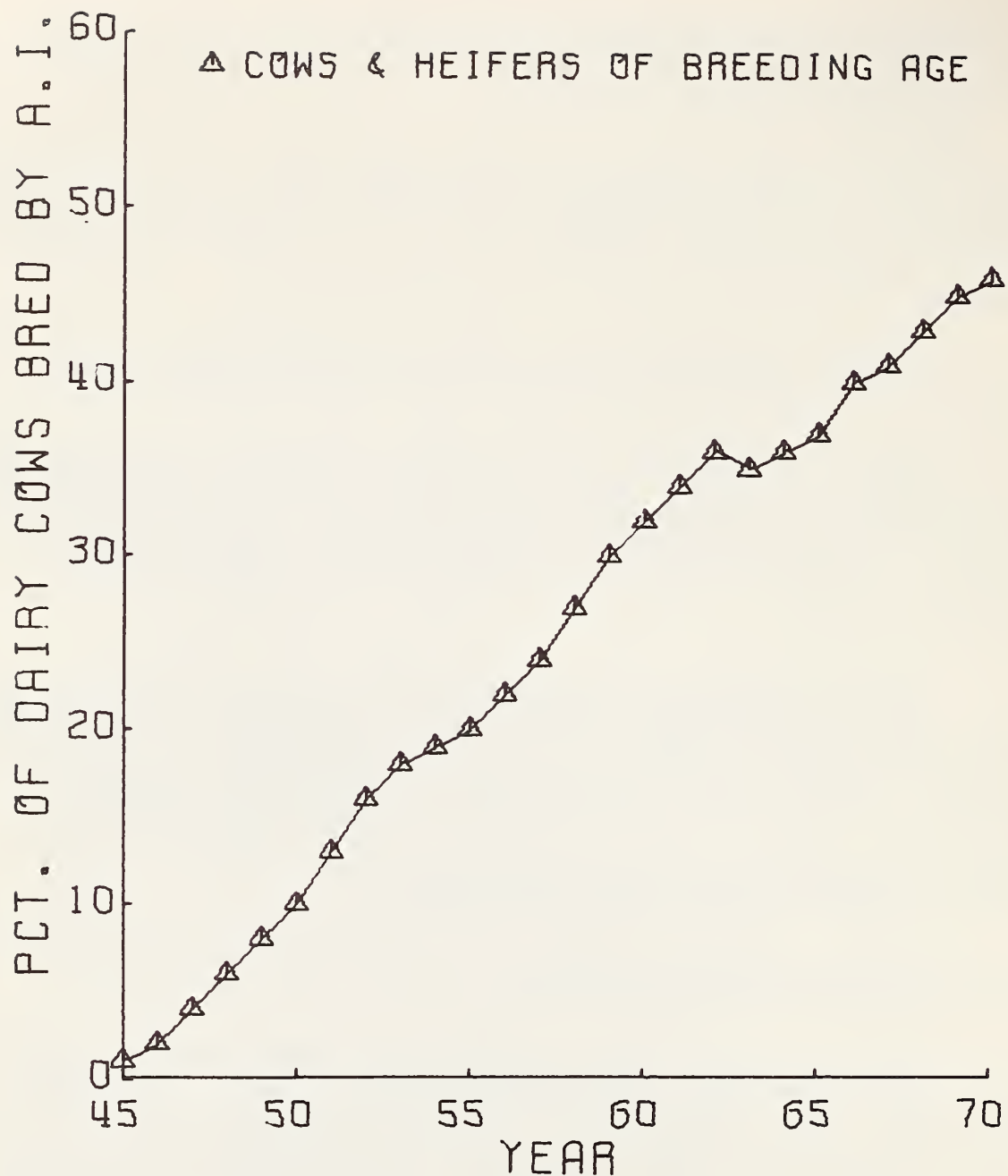


Figure 1.--Yearly trends in the percentages of U.S. dairy cows bred by A.I. since 1945.

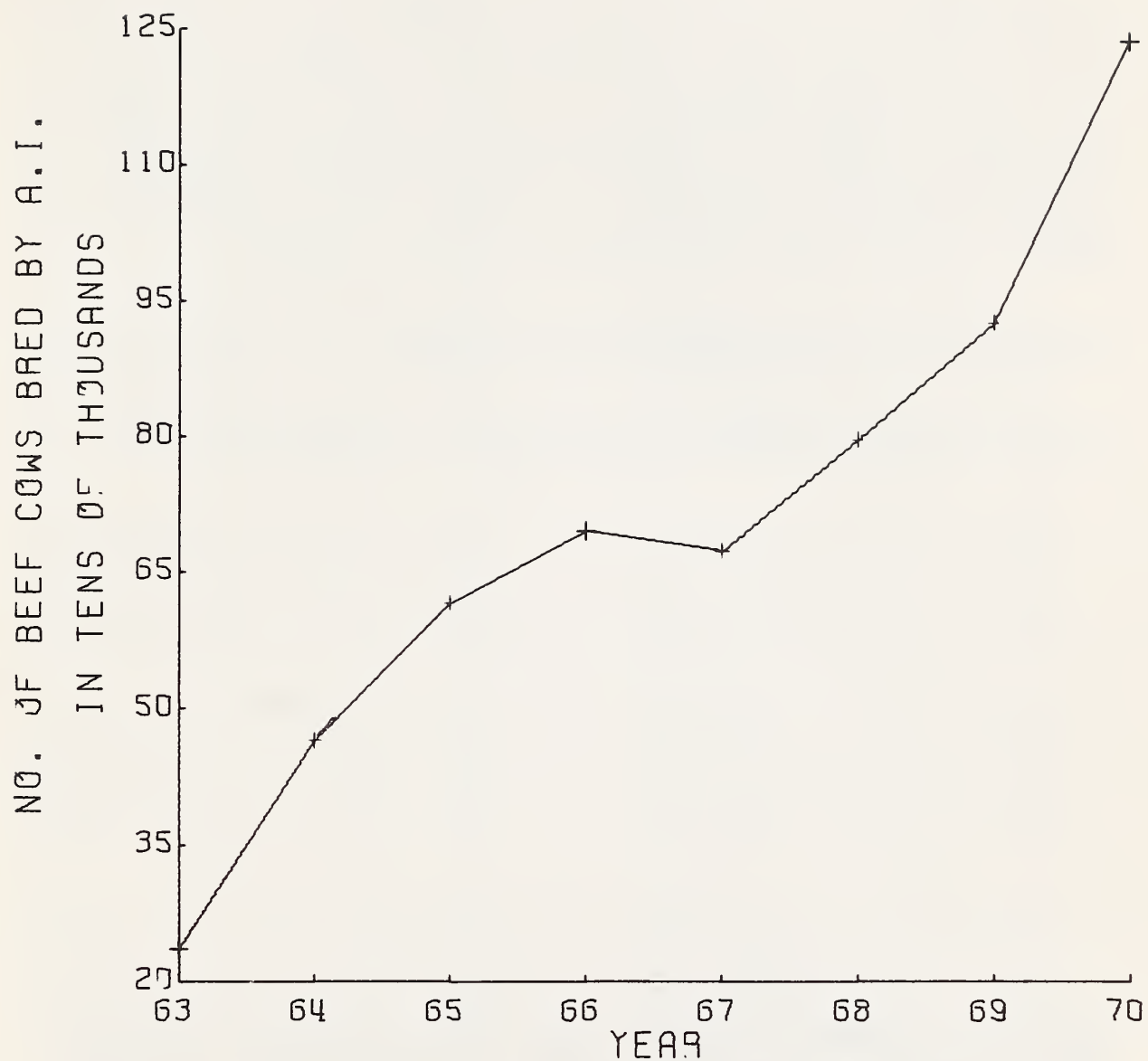


Figure 2.--Yearly trends in the number of U.S. beef cows bred by A.I.
since 1963

Table 9 shows that a total of 1,958 AI dairy and 349 AI beef bulls were in active service in 1970, an increase of 32 bulls from 1969.

Table 9 also shows the distribution of the 1,958 dairy bulls by breed and type of service. Nine hundred three or 46 percent of the dairy bulls were used in regular service; 923 or 47 percent were used for progeny testing only; and 132 or 7 percent were used for special or planned mating only. The number of bulls in regular service decreased in 1970; whereas the number for progeny testing increased; and the number available for special or planned mating decreased. Most of the 349 beef bulls were in regular service.

Table 10 lists artificial breeding organization bull studs active in the United States in 1970.

A list of Extension Dairywomen advising on the dairy cattle breeding program in each State is on page 17.

ERRATUM: Erratum 3 in ARS 44-226 (Vol. 47, No. 3) Dairy-Herd-Improvement Letter for March 1971, is not correct. It should read: Breed average tables 10 through 14 and 21 through 25 in this letter contain incorrect averages for succulent forage for 1969 because part of the data were unavailable.

TABLE 1.--Percentage of U.S. dairy cows and heifers bred artificially, by States, in 1970 1/

State	Rank by percent	State	Rank by percent
Florida-----	74.6	South Carolina----	42.7
Hawaii-----	67.8	Idaho-----	42.2
Alaska-----	65.2	North Carolina----	41.4
Utah-----	64.9	Illinois-----	40.5
California-----	61.5	Maryland-----	40.4
Connecticut-----	60.3	Kansas-----	35.7
Pennsylvania-----	60.0	Georgia-----	35.3
Wisconsin-----	57.8	Colorado-----	34.3
New Hampshire-----	57.5	Louisiana-----	34.2
Washington-----	57.4	Indiana-----	33.6
New York-----	56.8	Iowa-----	30.5
New Mexico-----	55.6	Tennessee-----	30.3
Nevada-----	54.2	Alabama-----	29.3
Massachusetts-----	53.1	West Virginia-----	28.6
Vermont-----	53.0	Wyoming-----	27.7
Arizona-----	52.8	Arkansas-----	27.6
Oregon-----	52.7	Montana-----	26.8
New Jersey-----	52.0	Missouri-----	26.1
Maine-----	51.7	Kentucky-----	24.8
Rhode Island-----	51.3	Nebraska-----	24.5
Ohio-----	50.8	Texas-----	24.4
Delaware-----	46.7	Oklahoma-----	24.3
Michigan-----	46.7	Mississippi-----	18.8
Minnesota-----	46.5	South Dakota-----	15.7
Virginia-----	44.1	North Dakota-----	15.1
		United States-----	46.3

1/ From Statistical Reporting Service (USDA) estimations. Percentage based on U.S. (dairy) cows and heifers 2 years old and older kept for milk plus 58.3 percent of heifers 1-2 years old. (Assuming that average age of first breeding is 17 months.)

TABLE 2.--Cows and heifers bred artificially to dairy and beef bulls in the United States in 1970

State or other source	Studs	Bred to dairy bulls in 1970		Bred to beef bulls in 1970	
		Registered dairy cows ^{1/}	Total dairy cows	Dairy cows	Beef cows
----- Number -----					
Alabama-----	0	6,254	46,427	4,566	13,217
Alaska-----	1	93	1,333	101	120
Arizona-----	0	4,118	30,187	1,521	2,689
Arkansas-----	0	3,423	29,038	3,825	11,583
California-----	4	74,734	572,451	24,345	31,472
Colorado-----	0	4,079	42,036	2,909	22,129
Connecticut-----	1	9,064	46,318	3,698	507
Delaware-----	0	2,512	7,482	924	200
Florida-----	0	11,874	146,491	12,386	24,295
Georgia-----	0	10,836	58,133	3,333	11,273
Hawaii-----	0	1,602	11,533	-----	959
Idaho-----	0	9,394	80,259	4,172	10,581
Illinois-----	1	32,079	144,289	16,130	20,446
Indiana-----	0	15,208	97,027	7,097	18,568
Iowa-----	0	22,596	177,375	24,054	56,767
Kansas-----	1	9,321	84,216	5,872	64,768
Kentucky-----	0	13,907	96,064	13,082	29,954
Louisiana-----	1	9,326	71,456	3,721	20,930
Maine-----	0	8,386	42,288	3,685	288
Maryland-----	0	22,867	79,411	3,375	4,383
Massachusetts---	0	7,625	38,336	3,616	329
Michigan-----	0	21,032	252,299	22,190	12,094
Minnesota-----	1	50,332	525,501	62,489	26,837
Mississippi-----	0	2,376	47,304	1,631	13,617
Missouri-----	0	12,488	112,290	8,043	42,327
Montana-----	0	1,628	12,745	1,460	70,390
Nebraska-----	0	6,358	50,059	6,083	36,429
Nevada-----	0	1,398	9,665	95	1,874
New Hampshire---	0	4,723	26,016	2,148	385
New Jersey-----	0	11,517	43,367	2,894	614
New Mexico-----	0	2,475	24,479	-----	6,195
New York-----	1	127,813	669,482	63,461	7,273
North Carolina--	1	16,415	91,463	7,044	13,312
North Dakota----	0	1,876	26,202	1,017	32,363
Ohio-----	2	41,317	254,228	31,472	42,706
Oklahoma-----	0	6,376	41,113	4,030	33,843
Oregon-----	0	10,946	66,566	6,224	14,551
Pennsylvania-----	2	134,817	502,128	54,399	23,967
Puerto Rico-----	1	9,765	68,511	-----	233
Rhode Island----	0	847	4,272	346	65
South Carolina--	0	5,683	32,725	1,884	3,009
South Dakota----	0	3,078	31,066	3,949	42,776
Tennessee-----	1	10,352	103,411	14,607	19,406
Texas-----	0	9,142	102,246	2,750	69,007
Utah-----	0	6,574	59,305	3,672	25,284
Vermont-----	0	23,559	125,508	11,287	739
Virginia-----	0	14,221	114,205	8,526	8,515
Washington-----	2	19,692	121,041	9,927	15,890
West Virginia---	0	3,987	20,535	1,204	4,165
Wisconsin-----	4	158,886	1,236,815	139,582	28,842
Wyoming-----	0	441	5,317	496	20,605
Reported AI activity, but State unknown ^{2/}	-	-----	47,084	-----	27,379
Services by all- beef studs ^{3/}	-	-----	-----	-----	244,208
United States---	24	999,412	6,729,098	615,322	1,234,358

^{1/} Data for registered cows may have been all or partly estimated when incomplete report was given.

^{2/} AI breeding activity reported for: NOBA, 6,169 cows; Curtiss, 2,500 cows; Midwest Breeders, 963 cows; KABSU, 1,800 cows; Select Sires, 6,839 cows; All West Breeders, 49,754 cows; Genetics, Inc., 6,438 cows. Total: 74,463 cows. Data were received from studs.

^{3/} Information obtained from NAAB, P. O. Box 1033, Columbia, Missouri 65201. See table 8 for data.

TABLE 3.--Percentage of U.S. dairy and beef cows and heifers bred artificially in 1970

State or other source	Dairy cows			Beef cows		
	Bred to dairy and beef bulls in 1970	U.S. dairy cows and heifers of breeding age 1-1-70 <u>1/</u> <u>2/</u>	Dairy cows and heifers bred	Bred to beef bulls in 1970	U.S. beef cows and heifers of breeding age 1-1-70 <u>3/</u> <u>4/</u>	Beef cows and heifers bred
	No.	Thou..	%	No.	Thou..	%
Alabama-----	50,993	174	29.3	13,217	1,013	1.3
Alaska-----	1,434	2.2	65.2	120	2.6	4.6
Arizona-----	31,708	60	52.8	2,689	408	0.7
Arkansas-----	32,863	119	27.6	11,583	1,013	1.1
California-----	596,796	970	61.5	31,472	1,085	2.9
Colorado-----	44,945	131	34.3	22,129	1,277	1.7
Connecticut-----	50,016	83	60.3	507	4	12.7
Delaware-----	8,406	18	46.7	200	6	3.3
Florida-----	158,877	213	74.6	24,295	976	2.5
Georgia-----	61,466	174	35.3	11,273	913	1.2
Hawaii-----	11,533	17	67.8	959	102	.9
Idaho-----	84,431	200	42.2	10,581	646	1.6
Illinois-----	160,419	396	40.5	20,446	884	2.3
Indiana-----	104,124	310	33.6	18,568	517	3.6
Iowa-----	201,429	660	30.5	56,767	1,721	3.3
Kansas-----	90,088	252	35.7	64,768	2,051	3.2
Kentucky-----	109,146	440	24.8	29,954	1,183	2.5
Louisiana-----	75,177	220	34.2	20,930	964	2.2
Maine-----	45,973	89	51.7	288	10	2.9
Maryland-----	82,786	205	40.4	4,383	68	6.4
Massachusetts--	41,952	79	53.1	329	5	6.6
Michigan-----	274,489	588	46.7	12,094	151	8.0
Minnesota-----	587,990	1,265	46.5	26,837	632	4.2
Mississippi-----	48,935	260	18.8	13,617	1,370	1.0
Missouri-----	120,333	461	26.1	42,327	2,099	2.0
Montana-----	14,205	53	26.8	70,390	1,709	4.1
Nebraska-----	56,142	229	24.5	36,429	2,190	1.7
Nevada-----	9,760	18	54.2	1,874	362	.5
New Hampshire--	28,164	49	57.5	385	2	19.3
New Jersey-----	46,261	89	52.0	614	10	6.1
New Mexico-----	24,479	44	55.6	6,195	767	.8
New York-----	732,943	1,290	56.8	7,273	72	10.1
North Carolina--	98,507	238	41.4	13,312	416	3.2
North Dakota--	27,219	180	15.1	32,363	1,026	3.2
Ohio-----	285,700	562	50.8	42,706	414	10.3
Oklahoma-----	45,143	186	24.3	33,843	2,348	1.4
Oregon-----	72,790	138	52.7	14,551	738	2.0
Pennsylvania--	556,527	928	60.0	23,967	116	20.7
Puerto Rico----	68,511	-----	-----	233	-----	-----
Rhode Island---	4,618	9	51.3	65	1	6.5
South Carolina--	34,609	81	42.7	3,009	292	1.0
South Dakota---	35,015	223	15.7	42,776	1,879	2.3
Tennessee-----	118,018	389	30.3	19,406	1,040	1.9
Texas-----	104,996	431	24.4	69,007	6,177	1.1
Utah-----	62,977	97	64.9	25,284	379	6.7
Vermont-----	136,795	258	53.0	739	7	10.6
Virginia-----	122,731	278	44.1	8,515	541	1.6
Washington-----	130,968	228	57.4	15,890	419	3.8
West Virginia--	21,739	76	28.6	4,165	222	1.9
Wisconsin-----	1,376,397	2,380	57.8	28,842	286	10.1
Wyoming-----	5,813	21	27.7	20,605	775	2.7
Reported AI activity, but State unknown ^{5/}	47,084	-----	-----	27,379	-----	-----
Services by all beef studs ^{5/}	-----	-----	-----	244,208	-----	-----
United States--	7,344,420	15,861	46.3	1,234,358	41,289	3.0

1/ Source of data: U.S. cows and heifers 2 years old and older kept for milk, January 1, 1970, plus 58.3 percent of heifers 1-2 years old kept for milk, January 1, 1970. Estimated by Statistical Reporting Service (USDA).

2/ Dairy cattle on farms, January 1, 1970, are those available for breeding in 1970; 58.3 percent of heifers 1-2 years old were added as the percentage of those coming to breeding age in 1970 that were bred in 1970, assuming that the average age of first breeding is 17 months.

3/ Source of data: U.S. beef cows 2 years and older, January 1, 1970, plus 40 percent of heifers 1-2 years old, January 1, 1970. Estimated by Statistical Reporting Service (USDA).

4/ Beef cattle on farms, January 1, 1970, are those available for breeding in 1970; 40 percent of heifers 1-2 years old were added as the percentage of those coming to breeding age in 1970 that were bred in 1970.

5/ See table 2, footnotes 2 and 3, for source of data.

TABLE 4.--Dairy cows bred artificially, as a percentage of U.S. dairy cows and heifers of breeding age, 1945-1970, inclusive

Year	Dairy cows bred to dairy and beef bulls	U.S. dairy cows and heifers of breeding age 1/	Dairy cows bred, as a percentage of U.S. dairy cows and heifers of breeding age
	No.	Thou.	%
1945	360,732	31,447	1.1
1946	537,376	29,878	1.8
1947	1,184,168	29,062	4.1
1948	1,713,581	27,851	6.2
1949	2,091,175	26,968	7.8
1950	2,619,555	26,998	9.7
1951	3,509,573	26,770	13.1
1952	4,295,243	26,380	16.3
1953	4,845,222	26,985	18.0
1954	5,155,240	27,320	18.9
1955	5,413,874	26,835	20.2
1956	5,762,656	26,064	22.1
1957	6,055,982	25,396	23.8
1958	6,645,568	24,253	27.4
1959	6,932,294	23,076	30.0
1960	7,144,679	22,488	31.8
1961	7,482,740	22,195	33.7
1962	7,748,687	21,812	35.5
1963	7,438,293	21,124	35.2
1964	7,282,994	20,209	36.0
1965	7,264,835	19,400	37.4
1966	7,286,580	18,237	40.0
1967	7,048,358	17,318	40.7
1968	7,138,636	16,731	42.7
1969	7,285,063	16,209	44.9
1970	7,344,420	15,861	46.3

1/ U.S. cows and heifers 2 years old and older kept for milk January 1, plus 58.3 percent of heifers 1-2 years old kept for milk, January 1, (58.3% based on assumption that average age of first breeding is 17 months). Estimated by Statistical Reporting Service (USDA).

TABLE 5.--States with the highest number and percentage of dairy and beef cows bred artificially in 1970

Rank	State	Cows bred artificially	Rank	State	Cows bred artificially
		No.			%
<u>DAIRY COWS</u>					
1	Wisconsin	1,376,397	1	Florida	74.6
2	New York	732,943	2	Hawaii	67.8
3	California	596,796	3	Alaska	65.2
4	Minnesota	587,990	4	Utah	64.9
5	Pennsylvania	556,527	5	California	61.5
6	Ohio	285,700	6	Connecticut	60.3
7	Michigan	274,489	7	Pennsylvania	60.0
8	Iowa	201,429	8	Wisconsin	57.8
9	Illinois	160,419	9	New Hampshire	57.5
10	Florida	158,877	10	Washington	57.4
<u>BEEF COWS</u>					
1	Montana	70,390	1	Pennsylvania	20.7
2	Texas	69,007	2	New Hampshire	19.3
3	Kansas	64,768	3	Connecticut	12.7
4	Iowa	56,767	4	Vermont	10.6
5	South Dakota	42,776	5	Ohio	10.3
6	Ohio	42,706	6	New York	10.1
7	Missouri	42,327	7	Wisconsin	10.1
8	Nebraska	36,429	8	Michigan	8.0
9	Oklahoma	33,843	9	Utah	6.7
10	North Dakota	32,363	10	Massachusetts	6.6

TABLE 6.--Comparison of artificial breeding in the United States for 1969 and 1970

State or other source	Dairy cows bred artificially--				Beef cows bred artificially--			
	In 1969	In 1970	Increase or decrease	Change in pct. of U.S. cows and heifers	In 1969	In 1970	Increase or decrease	Change in pct. of U.S. cows and heifers
	No.	No.	No.	%	No.	No.	No.	%
Alabama-----	50,877	50,993	+116	+0.9				
Alaska-----	1,011	1,434	+423	+17.1	7,400	13,217	+5,817	+0.5
Arizona-----	29,246	31,708	+2,462	+4.9	20	120	+100	+3.9
Arkansas-----	24,899	32,863	+7,964	+7.2	4,077	2,689	-1,388	-3
California-----	550,796	596,796	+46,000	+5.3	8,052	11,583	+3,531	+3
Colorado-----	45,861	44,945	-916	-1.5	20,084	31,472	+11,388	+1.1
Connecticut-----	54,174	50,016	-4,158	-3.4	12,104	22,129	+10,025	+7
Delaware-----	8,604	8,406	-198	-1.1	184	507	+323	+8.1
Florida-----	156,443	158,877	+2,434	-6	100	200	+100	+1.6
Georgia-----	65,915	61,466	-4,449	-2.6	17,865	24,295	+6,430	+6
					7,670	11,273	+3,603	+3
Hawaii-----	15,906	11,533	-4,373	-25.8	295	959	+664	+6
Idaho-----	80,674	84,431	+3,757	+2.5	8,549	10,581	+2,032	+2
Illinois-----	170,635	160,419	-10,216	-7	15,058	20,446	+5,388	+6
Indiana-----	111,153	104,124	-7,029	-1.7	15,900	18,568	+2,668	+5
Iowa-----	204,215	201,429	-2,786	+1.3	40,459	56,767	+16,308	+9
Kansas-----	97,106	90,088	-7,018	-1.6	53,424	64,768	+11,344	+5
Kentucky-----	119,199	109,146	-10,053	-1.5	20,902	29,954	+9,052	+6
Louisiana-----	71,961	75,177	+3,216	+2.1	21,182	20,930	-252	0
Maine-----	45,297	45,973	+676	+1.9	105	288	+183	+1.8
Maryland-----	91,267	82,786	-8,481	-3.7	3,926	4,383	+457	+2
Massachusetts----	44,326	41,952	-2,374	+3	327	329	+2	+1
Michigan-----	282,993	274,489	-8,504	-1.3	9,288	12,094	+2,806	+1.6
Minnesota-----	591,696	587,990	-3,706	+2.1	27,918	26,837	-1,081	-3
Mississippi-----	64,175	48,935	-15,240	-5.0	10,245	13,617	+3,372	+2
Missouri-----	123,949	120,333	-3,616	-1	34,938	42,327	+7,389	+2
Montana-----	12,541	14,205	+1,664	+4.0	52,109	70,390	+18,281	+1.0
Nebraska-----	51,502	56,142	+4,640	+3.7	26,456	36,429	+9,973	+5
Nevada-----	6,251	9,760	+3,509	+19.5	1,862	1,874	+12	0
New Hampshire----	24,594	28,164	+3,570	+8.3	80	385	+305	+15.3
New Jersey-----	47,899	46,261	-1,638	-6	502	614	+112	+1.1
New Mexico-----	19,916	24,479	+4,563	+10.3	3,590	6,195	+2,605	+3
New York-----	721,293	732,943	+11,650	+9	3,349	7,273	+3,924	+5.0
North Carolina---	95,603	98,507	+2,904	+2.1	11,116	13,312	+2,196	+2
North Dakota----	24,124	27,219	+3,095	+2.1	20,506	32,363	+11,857	+1.2
Ohio-----	291,388	285,700	-5,688	+1	33,555	42,706	+9,151	+1.4
Oklahoma-----	30,985	45,143	+14,158	+8.1	14,598	33,843	+19,245	+7
Oregon-----	67,836	72,790	+4,954	+4.2	10,744	14,551	+3,807	+5
Pennsylvania-----	559,767	556,527	-3,240	+6	11,244	23,967	+12,723	+11.1
Puerto Rico-----	72,624	68,511	-4,113	----	-----	233	+233	----
Rhode Island-----	3,989	4,618	+629	+7.0	130	65	-65	-6.5
South Carolina---	36,643	34,609	-2,034	-4	2,666	3,009	+343	0
South Dakota-----	30,062	35,015	+4,953	+3.0	29,855	42,776	+12,921	+7
Tennessee-----	93,204	118,018	+24,814	+6.8	18,704	19,406	+702	0
Texas-----	109,180	104,996	-4,184	-1.5	66,865	69,007	+2,142	0
Utah-----	65,745	62,977	-2,768	-3.6	12,851	25,284	+12,433	+3.1
Vermont-----	133,584	136,795	+3,211	+2.0	485	739	+254	+2.5
Virginia-----	127,428	122,731	-4,697	0	7,343	8,515	+1,172	+2
Washington-----	131,560	130,968	-592	+2	11,325	15,890	+4,565	+1.1
West Virginia----	24,034	21,739	-2,295	-1.8	3,021	4,165	+1,144	+5
Wisconsin-----	1,348,308	1,376,397	+28,089	+2.0	30,279	28,842	-1,437	-1.0
Wyoming-----	5,710	5,813	+103	+1.7	15,068	20,605	+5,537	+7
Reported AI activity, but State unknown ^{1/-}	46,915	47,084	+169	----	5,697	27,379	+21,682	----
Services by all beef studs ^{1/-}	-----	-----	-----	----	190,309	244,208	+53,899	----
							+60,337	
United States----	7,285,063	7,344,420	+59,357	+1.4	924,381	1,234,358	+309,977	+7

^{1/} For 1970 see table 2 and footnotes. For 1969 see table 2 and footnotes in the July 1970 Dairy-Herd-Improvement Letter covering the Artificial Breeding Report for 1969.

TABLE 7.--Status of artificial breeding program in the United States, 1939-1971 inclusive

Year	Studs	Sires in service				Herds ^{1/}	Dairy cows bred to-		Beef cows bred to beef bulls	Total cattle bred	Cows bred per sire
		Dairy	Beef	Total	Average per stud		Dairy bulls	Beef bulls			
----- Number -----											
1939	7	-----	---	33	4.7	646	-----	-----	-----	7,359	228
1940	25	-----	---	138	5.5	2,971	-----	-----	-----	33,977	246
1941	35	-----	---	237	6.8	5,997	-----	-----	-----	70,751	299
1942	46	-----	---	412	9.0	12,118	-----	-----	-----	112,788	274
1943	59	-----	---	574	9.7	23,448	-----	-----	-----	182,524	318
1944	56	-----	---	657	11.7	28,627	-----	-----	-----	218,070	332
1945	67	-----	---	729	10.9	43,998	-----	-----	-----	360,732	495
1946	78	-----	---	900	11.5	73,293	-----	-----	-----	537,376	597
1947	84	-----	---	1,453	17.3	140,571	-----	-----	-----	1,184,168	815
1948	91	-----	---	1,745	19.2	224,493	-----	-----	-----	1,713,581	982
1949	90	-----	---	1,940	21.6	316,177	-----	-----	-----	2,091,175	1,078
1950	97	-----	---	2,104	21.7	409,300	-----	-----	-----	2,619,555	1,245
1951	94	-----	---	2,187	23.3	548,300	-----	-----	-----	3,509,573	1,605
1952	94	-----	---	2,324	24.7	671,100	-----	-----	-----	4,295,243	1,848
1953	96	-----	---	2,598	27.1	755,000	-----	-----	-----	4,845,222	1,865
1954	93	-----	---	2,661	28.6	805,000	-----	-----	-----	5,155,240	1,937
1955	79	-----	---	2,450	31.0	845,900	-----	-----	-----	5,413,874	2,210
1956	79	-----	---	2,553	32.3	900,400	-----	-----	-----	5,762,656	2,257
1957	75	-----	---	2,651	35.3	946,000	-----	-----	-----	6,055,982	2,284
1958	71	-----	---	2,676	37.7	975,372	-----	-----	-----	6,645,568	2,483
1959	64	-----	---	2,460	38.4	930,059	-----	-----	-----	6,932,294	2,816
1960	62	-----	---	2,544	41.0	910,000	-----	-----	-----	7,144,679	2,808
1961	56	-----	---	2,486	44.4	863,781	7,047,148	2/435,592	-----	7,482,740	3,010
1962	56	2,036	420	2,456	43.9	862,150	6,837,681	2/911,006	-----	7,748,687	3,155
1963	51	2,158	401	2,559	50.2	621,141	6,468,545	969,748	235,289	7,673,582	2,999
1964	50	2,140	398	2,538	50.8	654,311	6,165,599	1,117,395	464,959	7,747,953	3,053
1965	3/46	1,867	449	2,316	50.3	591,859	6,301,178	963,657	615,147	7,879,982	3,402
1966	3/44	1,949	439	2,388	54.3	540,265	6,413,453	873,127	695,181	7,981,761	3,342
1967	35	2,012	364	2,376	67.9	458,782	6,259,425	788,933	672,819	4/7,871,265	3,313
1968	3/33	2,028	352	2,380	72.1	407,375	6,423,786	714,850	795,242	7,933,878	3,334
1969	3/30	1,955	390	2,345	78.2	387,979	6,590,147	694,916	924,381	8,209,444	3,501
1970	31	1,911	364	2,275	73.4	369,197	6,729,098	615,322	1,234,358	8,578,778	5/3,644
1971	5/24	1,958	349	2,307	96.1	-----	-----	-----	-----	-----	-----

1/ Prior to 1963, number of herds largely reflected membership rather than those actually serviced.

2/ Probably includes some beef to beef inseminations.

3/ Includes one all-beef stud.

4/ Total cattle bred in 1967 includes 150,088 first services, by State only, where breakdowns were not reported.

5/ Based only on data where bulls were reported.

TABLE 8.--Cows bred in artificial-breeding organization bull studs in 1970

Stud code	Name of stud ^{1/}	Herds serviced	Cows bred in 1970						Total breedings of--		Estimated total number of cows bred
			First services				Semen sales and custom-freezing				
			Dairy total	Dairy to beef	Beef to beef	Total first services	Dairy to dairy	Beef to beef	Dairy cows	Beef cows	
----- Number -----											
1607	Herdsman-----	2/320	6,714	-----	-----	6,714	7,000	-----	13,714	-----	13,714
2110	Eastern AIC-----	30,530	635,126	64,480	648	700,254	2,604	-----	702,210	648	702,858
2309	Atlantic-----	11,436	196,747	25,197	4,447	226,391	688	-----	222,632	4,447	227,079
2313	Sire Power <u>3/</u> ----	15,100	216,695	12,539	19,188	248,422	1,666	-----	230,900	19,188	250,088
3102	NOBA-----	9,549	238,534	26,699	9,914	275,147	12,573	15,236	277,806	25,150	302,956
3303	Curtiss-----	37,513	936,636	110,705	114,093	1,161,434	-----	2,500	1,047,341	116,593	1,163,934
3407	General Genetics-----	800	23,497	900	300	24,697	-----	-----	24,397	300	24,697
3503	East Central-----	4,250	75,214	10,813	500	86,527	3,988	103	90,015	603	90,618
3505	Tri-State-----	16,520	357,094	41,306	4,000	402,400	34,178	2,993	432,578	6,993	439,571
3521	Midwest Breeders-----	35,093	554,057	74,681	18,430	647,168	74,722	24,979	703,460	43,409	746,869
3575	ABS-----	2/87,506	1,365,331	81,003	391,307	1,837,641	-----	-----	1,446,334	391,307	1,837,641
4101	Minnesota Valley-----	18,134	218,353	28,436	7,108	253,897	20,034	17,987	266,823	25,095	291,918
4801	KABSU-----	2,573	37,091	2,069	26,445	65,605	3,385	30,920	42,545	57,365	99,910
5501	N.C. Instit.B.P-----	10	983	-----	-----	983	-----	-----	983	-----	983
6102	Select Sires-----	2/53,520	419,790	62,153	36,625	518,568	242,818	119,225	724,761	155,850	880,611
6303	West Tennessee-----	492	4,995	226	1,515	6,736	-----	-----	5,221	1,515	6,736
7201	Louisiana ABC-----	4,225	55,625	3,721	7,220	66,566	10,542	12,520	69,888	19,740	89,628
9111	Carnation-----	2/23,504	383,386	42,601	67,599	493,586	-----	-----	425,987	67,599	493,586
9113	All West-----	15,000	124,946	2/13,980	2/17,297	156,223	40,131	9,623	179,057	26,920	205,977
9302	Adohr-----	5	3,115	-----	-----	3,115	410	-----	3,525	-----	3,525
9303	Excelsior-----	138	38,800	899	-----	39,699	37,500	766	77,199	766	77,965
9316	Genetics, Inc-----	2,506	279,228	12,824	6,962	299,014	-----	3,700	292,052	10,662	302,714
9401	P.R. AI Center-----	418	35,000	-----	175	35,175	6,145	23	41,145	198	41,343
9601	Matanuska Valley-----	25	864	40	37	941	100	-----	1,004	37	1,041
Reported AI activity by individual operators <u>4/</u>		30	1,500	50	450	2,000	1,000	-----	2,550	450	3,000
8401	Colorado State University-----	-----	-----	-----	-----	-----	2,630	13,038	2,630	13,038	15,668
9317	The Bull Bank-----	-----	-----	-----	-----	-----	17,663	2,277	17,663	2,277	19,940
Hawkeye Breeders Service <u>5/</u> -----		-----	-----	-----	-----	-----	-----	3,500	-----	3,500	3,500
Eastern Frozen Semen Service <u>5/</u> -----		-----	-----	-----	-----	-----	-----	28,960	-----	28,960	28,960
5103	Wye Plantation <u>5/</u> -----	-----	-----	-----	8,463	8,463	-----	-----	-----	8,463	8,463
8406	International Beef Breeders <u>5/</u> -----	-----	-----	-----	13,962	13,962	-----	189,323	-----	203,285	203,285
United States-----		369,197	6,209,321	615,322	756,685	7,581,328	519,777	477,673	7,344,420	1,234,358	8,578,778

^{1/} See table 10 for list of names and addresses of studs.^{2/} Data may have been all or partly estimated when incomplete report was given.^{3/} Merger of Northeastern Breeders Association in Pennsylvania and Maryland-West Virginia Bull Stud in Maryland.^{4/} Data were reported by Extension Dairyman in Nevada.^{5/} Information obtained from NAAB, P.O. Box 1033, Columbia, Missouri 65201.

TABLE 9.--Bulls used in artificial-breeding organization bull studs during 1970

Stud code	Name of stud ^{1/}	Bulls by breed ^{2/}							Type of service by dairy bulls			
		Ayr- shire	Brown Swiss	Guern- sey	Hol- stein	Jer- sey	Short- horn	Beef	Total	Regular	Special or planned mating	Progeny testing
		-----Number-----										
1607	Herdsman-----	--	--	--	1	--	--	--	1	1	---	---
2110	Eastern AIC-----	14	7	18	220	27	--	10	296	92	2	192
2309	Atlantic-----	2	3	13	36	5	--	12	71	46	12	1
2313	Sire Power 3/-----	10	4	18	109	14	--	7	162	45	18	92
3102	NOBA-----	--	5	10	37	19	--	29	100	39	2	30
3303	Curtiss-----	7	5	9	105	10	3	4/47	186	128	9	2
3407	General Genetics--	--	--	--	3	--	--	--	3	3	---	---
3503	East Central-----	--	1	1	30	--	--	4	36	29	3	---
3505	Tri-State-----	1	6	17	70	5	--	5	104	87	12	---
3521	Midwest Breeders--	--	4	11	77	6	4	15	117	46	16	40
3575	ABS-----	5	5	14	310	23	2	89	448	90	46	223
4101	Minnesota Valley--	1	6	7	94	2	4	20	134	47	5	62
4801	KABSU-----	1	2	1	22	1	--	25	52	26	1	---
5501	N.C. Instit. B.P.--	--	--	--	11	--	--	--	11	2	---	9
6102	Select Sires-----	1	10	25	142	26	1	4/40	245	49	---	156
6303	West Tennessee----	--	--	--	3	--	--	--	3	3	---	---
7201	Louisiana ABC-----	--	--	6	12	11	--	8	37	4	1	24
9111	Carnation-----	2	5	8	54	5	2	12	88	50	---	26
9113	All West-----	--	--	11	37	11	--	24	83	59	---	---
9302	Adohr 4/-----	--	--	6	8	--	--	--	14	12	2	---
9303	Excelsior-----	--	--	--	25	--	--	--	25	19	---	6
9316	Genetics, Inc-----	--	1	3	62	8	--	2	76	11	3	60
9401	P. R. AI Center----	--	--	--	9	--	--	--	9	9	---	---
9601	Matanuska Valley--	--	--	--	6	--	--	--	6	6	---	---
United States-----		44	64	178	1,483	173	16	349	2,307	903	132	923

^{1/} See table 10 for list of names and addresses of studs.^{2/} These counts are based on where bulls are housed and do not reflect the fact that they are available to more than one stud.^{3/} Merger of Northeastern Breeders Association in Pennsylvania and Maryland-West Virginia Bull Stud in Maryland.^{4/} Based on last report available (January 1, 1970).

TABLE 10.--Artificial-breeding organization bull studs in the United States

State	Stud code	Name and address
Alaska-----	9601	Matanuska Valley Breeders Association, Institute of Agricultural Sciences, Box AE, Palmer 99645.
California-----	9302	Adohr Farms Inseminating Service, P. O. Box 88, Camarillo 93010.
	9303	Excelsior Farms, 7401 Adams Avenue, Rt. 1, Corona 91720.
	9316	Genetics, Inc., P. O. Box 938, Hughson 95326.
	<u>1</u> /9317	The Bull Bank, 18907 East Lone Tree Road, Escalon 95320.
Colorado-----	<u>1</u> /8401	Colorado State University, Animal Reproduction Laboratory, 809 City Park Avenue, Fort Collins 80521.
Connecticut-----	1607	Herdsmen, Box 391, Fox Road, Putnam 06260.
Illinois-----	3303	Curtiss Breeding Service, Cary 60013.
Kansas-----	4801	Kansas Artificial Breeding Service Unit, Anderson Hall, Kansas State University, Manhattan 66502.
Louisiana-----	7201	Louisiana Animal Breeders Cooperative, Inc., Box BD, Louisiana State University, Baton Rouge 70803.
Michigan-----	3407	General Genetics, Box 23, Jenison 49428.
Minnesota-----	4101	Minnesota Valley Breeders Association, New Prague 56071.
New York-----	2110	Eastern Artificial Insemination Cooperative, Inc., Box 518, Ithaca 14850.
North Carolina--	5501	N. C. Institutional Breeding Association, 231 Polk Hall, North Carolina State University, Raleigh 27607.
Ohio-----	3102	NOBA, Inc., P. O. Box 607, Tiffin 44883.
	6102	Select Sires, Inc., 1224 Alton-Darby Road, Columbus 43228.
Pennsylvania----	2309	Atlantic Breeders Cooperative, Box 254, Lancaster 17604.
	2313	Sire Power, Inc., R. D. 2, Tunkhannock 18657.
Puerto Rico-----	9401	Puerto Rico Artificial Insemination Center, Box 726, Dorado 00646.
Tennessee-----	6303	West Tennessee ABA, Box 38, Yorkville 38389.
Washington-----	9111	Carnation Farms Breeding Service, Carnation 98014.
	9113	All West Breeders, P. O. Box 197, Burlington 98233.
Wisconsin-----	3503	East Central Breeders Association Cooperative, P. O. Box 191, Waupun 53963.
	3505	Tri-State Breeders Cooperative, Westby 54667.
	3521	Midwest Breeders Cooperative, P. O. Box 469, Shawano 54166.
	3575	American Breeders Service, Inc., De Forest 53532.
ALL-BEEF STUDS <u>2</u> /		
Colorado-----	8406	International Beef Breeders, Inc., Box 29007, Denver 80229.
Iowa-----		Hawkeye Breeders Service, Inc., 4535 N. W. First, Des Moines 50313.
Maryland-----		Eastern Frozen Semen Service, Rt. 10, Frederick 21701.
	5103	Wye Plantation, Queenstown 21658.

1/ Studs own no bulls, but market semen of bulls owned by individuals or other studs.2/ No count of bulls owned, if any, was available, so studs are not listed in table 9.

Extension Dairyman Advising on Dairy Cattle Breeding Programs in each State
as of January 1, 1971

Ala----- R. S. Jones, Jr., Dairy Science Dept., Auburn University, Auburn 36830.
Alaska--- A. L. Brundage, Experiment Station Research Staff, University of Alaska, Palmer 99645.
Ariz----- W. R. Van Sant, Dept. of Dairy Science, University of Arizona, Tucson 85721.
Ark----- L. Ratcliff, Animal Industry & Veterinary Science Dept., University of Arkansas,
Little Rock 72203.
Calif---- F. D. Murrill, Animal Science Bldg., University of California, Davis 95616.
Colo----- D. C. Jordan, Animal Science Dept., Colorado State University, Fort Collins 80521.
Conn----- R. H. Benson, Animal Industries Dept., University of Connecticut, Storrs 06268.
Del----- W. R. Hesselstine, College of Agr. Sciences, University of Delaware, Newark 19711.
Fla----- C. W. Reaves, Dairy Science Bldg., University of Florida, Gainesville 32601.
Ga----- J. N. Maddux, Animal Industry Division, University of Georgia, Athens 30601.
Hawaii--- H. R. Donoho, Animal Science Dept., University of Hawaii, Honolulu 96822.
Idaho---- G. W. Cleveland, Dairy Science Dept., University of Idaho, P.O. Box 300, Boise 83701.
Ill----- R. V. Johnson, Dairy Science Dept., University of Illinois, Urbana 61803.
Ind----- N. J. Moeller, Dept. of Animal Sciences, Purdue University, Lafayette 47907.
Iowa----- B. R. Eastwood, Animal and Dairy Science Dept., Iowa State University, Ames 50010.
Kans----- E. R. Bonewitz, Dairy Science Dept., Kansas State University, Manhattan 66504.
Ky----- J. H. Nicolai, Jr., Dairy Production Dept., University of Kentucky, Lexington 40506.
La----- H. W. Anderson, La. Agr. Extension Service, Louisiana State University, Baton Rouge
70803.
Maine---- C. K. Walker, Animal Science Dept., University of Maine, Orono 04473.
Md----- D. T. Buchman, Dairy Science Dept., University of Maryland, College Park 20742.
Mass----- S. N. Gaunt, Veterinary and Animal Sciences Dept., University of Massachusetts,
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Mich----- C. E. Meadows, Dairy Genetics and Breeding, Michigan State University, East Lansing,
48823.
Minn----- B. J. Conlin, Dept. of Animal Science, University of Minnesota, St. Paul 55101.
Miss----- G. B. Crain, Dairy Science Dept., Mississippi State University, State College 39762.
Mo----- R. E. Ricketts, Dairy Husbandry Dept., University of Missouri, Columbia 65202.
Mont----- B. R. Moss, Dept. of Animal Science and Range Management, Montana State University,
Bozeman 59715.
Nebr----- P. H. Cole, Dairy Science Dept., University of Nebraska, Lincoln 68503.
Nev----- H. P. Adams, Animal Science Dept., University of Nevada, Reno 89507.
N. H----- T. P. Fairchild, Animal Science Dept., University of New Hampshire, Durham 03824.
N. J----- E. T. Oleskie, Animal Science Dept., Rutgers University, New Brunswick 08903.
N. Mex---- J. B. Ellis, Dairy Dept., New Mexico State University, University Park 88070.
N. Y----- H. W. Carter, Animal Husbandry Dept., Cornell University, Ithaca 14850.
N. C----- F. D. Sargent, Animal Science Dept., North Carolina State University, Raleigh 27607.
N. Dak---- G. R. Fisher, Dairy Husbandry Dept., North Dakota State University, Fargo 58103.
Ohio----- C. D. McGrew, Dairy Science Dept., Ohio State University, Columbus 43210.
Okla----- C. H. Burton, Dept. of Dairying, Oklahoma State University, Stillwater 74074.
Oreg----- D. E. Anderson, Animal Science Dept., Oregon State University, Corvallis 97331.
Pa----- L. W. Specht, Dairy Science Dept., Pennsylvania State University, University Park
16802.
P. R----- C. A. Calderon, Animal Husbandry Dept., University of Puerto Rico, Rio Piedras
00928.
R. I----- J. W. Atwood, Dairy Science Dept., University of Rhode Island, Kingston 02881.
S. C----- W. L. Northern, Dairy Science Dept., Clemson University, Clemson 29631.
S. Dak---- E. J. Kleen, Dairy Science Dept., South Dakota State University, Brookings 57007.
Tenn----- C. K. Chappell, Dairy Dept., University of Tennessee, Knoxville 37916.
Tex----- A. M. Meekma, Dairy Science Dept., Texas A & M University, College Station 77843.
Utah----- J. J. Barnard, Dairy Industry Dept., Utah State University, Logan 84321.
Vt----- K. S. Gibson, Animal and Dairy Science Dept., University of Vermont, Burlington
05401.
Va----- W. N. Patterson, Dairy Science Dept., Virginia Polytechnic Institute, Blacksburg
24061.
Wash----- B. F. Kelso, W. W. Research and Extension Center, Puyallup 98371.
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Wis----- E. E. Starkey, Dairy Science Dept., University of Wisconsin, Madison 53706.
Wyo----- R. H. Anderson, Division of Animal Science, University of Wyoming, Laramie 82071.

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